The Number System (7.NS.A.1)

Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers.

Operations with Integers

	Addition	Subtraction	Multiplication	Division
Same Signs	Add the numbers. Keep the sign.	"Add the opposite" and then use the rules of addition.	When the signs are the same, the product is positive.	When the signs are the same, the quotient is positive.
	7 + 8 = 15 -5 + (-4) = -9	5 - 11 5 **+ (-11)** = -6	5 • 4 = 20 -3 • (-8) = 24	16 ÷ 2 = 8 -18 ÷ -3 = 6
Different Signs	Subtract the numbers. Keep the sign of the number with the larger absolute value.	"Add the opposite" and then use the rules of addition.	When the signs are different, the product is negative.	When the signs are different, the quotient is negative.
	20 + (-7) = 13 6 + (-10) = -4	-9 - 11 -9 **+ (-11)** = -20	12 • (-2) = -24 -10 • 10 = -100	-60 ÷ 12 = -5 56 ÷ -7 = -8

- The Absolute Value of a number is its distance from zero on the number line. (always positive)
- The Additive Inverse is the opposite of a number.
- The Additive Inverse Property states that any number plus its opposite equals zero. a + (-a) = 0

Properties of Addition and Multiplication

Commutative Property *The order of the numbers can change.*	a + b = b + a ab = ba	5 + 9 = 9 + 5 3 • 8 = 8 • 3
Associative Property *The numbers can be grouped differently but the order stays the same.*	(a + b) + c = a + (b + c) (a • b) • c = a • (b • c)	(4 + 3) + 7 = 4 + (3 + 7) (6 • 2) • 5 = 6 • (2 • 5)
Distributive Property *Multiply the number outside the parentheses to each number inside.*	a(b + c) = ab + ac a(b - c) = ab - ac	5(10 + 2) = 5(10) + 2(10) 3(9 - 1) = 3(9) - 3(1)
Identity Property *The sum or product is the same number you started with.*	a + 0 = 1 a • 1 = a	57 + 0 = 57 25 • 1 = 25
Additive Inverse Property *The sum of any number and its opposite is zero.*	a + (-a) = 0	16 + (-16) = 0
Zero Property of Multiplication *The product of any number and zero is zero.*	a • 0 = 0	21 • 0 = 0

The Number System (7.NS.A.1)

Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers.

1. Which of these expressions is equal to this expression? $5\frac{3}{4}-\left(-\frac{5}{8}\right)$

   A. $5\frac{3}{4}-\left(\frac{5}{8}\right)$

   B. $5\frac{3}{4}+\left(\frac{5}{8}\right)$

   C. $5\frac{3}{4}+\left(-\frac{5}{8}\right)$

   D. $5\frac{3}{4}+\left(+\frac{5}{8}\right)$

   E. $-5\frac{3}{4}+\left(-\frac{5}{8}\right)$

   F. $-5\frac{3}{4}+\left(+\frac{5}{8}\right)$

2. In which of these situations would the answer to the question be 0?

   A. Eddie jumped into a pool from a diving board 5 feet above the water. He sank 5 feet and then swam straight to the surface of the water. How many feet with Eddie swim?

   B. Ross left his house and jogged 3 miles directly west. Then he jogged 3 miles directly east. At this point, now many miles was Ross from his house?

   C. On Monday, the low temperature was -18°. The high temperature that day was 18°. What is the different between the low and high temperatures?

3. Consider the equations $8 + x = n$.

   What must be true about any value of x if n is a negative number? Explain your answer. Include an example with numbers to support your explanation.

4. On Monday, the temperature at 10 am at Sam's house was -6° Fahrenheit. The temperature at 2 pm at Sam's house was 2° Fahrenheit. Which statement about the temperature from 10 am to 2 pm at Sam's house is true?

   A. The temperature decreased by 12° F

   B. The temperature decreased by 4° F

   C. The temperature increased by 3° F

   D. The temperature increased by 8° F

5. Which expressions are equivalent to -5 - (2.5 + 7)? Select all that apply.

   A. (2.5 + 7) - 5

   B. -(2.5 + 7) - 5

   C. (2.5 + 7) + 5

   D. -5 - (7 + 2.5)

   E. -(5 - 2.5) + 7

   F. -5 + (-2.5 - 7)

   G. -5 + (-2.5 + 7)

6. Which expression is equivalent to 6.4 - 6.7?

   A. 6.7 - 6.4

   B. 6.4 + 6.7

   C. 6.4 + (-6.7)

   D. 6.4 - (-6.7)

7. A meteorologist was monitoring the temperature outside in degrees Fahrenheit (ºF) and wrote the expression 88 + (-10) - 7. Which statement best describes this expression?

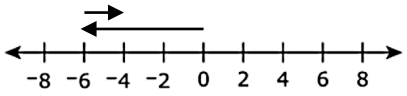
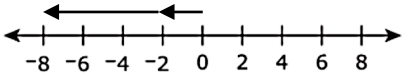
   A. The temperature started at 88ºF and increased by 10ºF. Then the temperature decreased by 7ºF.

   B. The temperature started at 88ºF and increased by 10ºF. Then the temperature increased by 7ºF.

   C. The temperature started at 88ºF and decreased by 10ºF. Then the temperature decreased by 7ºF.

   D. The temperature started at 88ºF and decreased by 10ºF. Then the temperature increased by 7ºF.

8. For each expression in the table, select which number line model, if any, can be used to represent the expression. Select all appropriate cells in the table.

Expression			Neither number line model can be used to represent the situation.
-2 + 6			
-6 + 2			
-2 - (-6)			
-2 - 6			
-6 - (-2)			

9. Tides are measures by the heights of the tide above or below sea level. The difference between the two heights represents how much greater the high tide is than the low tide. The table shows the high and low tides and the difference between their heights at each of three locations. Some of the data in the table are missing.

Location	High Tide	Low Tide	Difference Between High and Low Tides
P	8.53	0.63	?
Q	6.98	-0.94	7.92
R	?	-1.02	6.75

- Find the difference between high and low tides for location P. Show your work or explain your answer.

- Find high tide for location R. Show your work or explain your answer.

- The tides are measured at a fourth location, T. The mean of the low tide values at the locations P, Q, R, and T is -0.27 foot. What is the value of the low tide at location T? Show your work or explain how you found your answer.